TOUCH SUBSTRATE AND MANUFACTURING METHOD AND DRIVING METHOD THEREOF, TOUCH PANEL AND TOUCH DEVICE

FIELD OF THE INVENTION

[0001] The present invention relates to the field of touch technology, and specifically relates to a touch substrate, a manufacturing method and a driving method of the touch substrate, a touch panel and a touch device.

BACKGROUND OF THE INVENTION

[0002] Currently, touch panels in the market are mainly divided into capacitive touch panels and resistive touch panels. A capacitive touch panel comprises an array substrate, a color filter substrate and a touch substrate, referring to FIGS. **1** and **2**, a touch substrate of prior art comprises a base substrate **10**, a drive sensing electrode layer **20**, a protective layer **30** and a metal layer **40**, wherein the drive sensing electrode layer **20** comprises a sensing electrode **201** and a driving electrode **202**, and a glass cover (not shown in the figures) is also provided above the metal layer **40**. When a user touches the touch substrate by a finger, under action of electric field of human body, coupling capacitances will be generated between the finger and the sensing electrode **201** and the driving electrode **202**, based on varies of the capacitances generated at the touch point by the sensing electrode **201** and the driving electrode **202**, position of the touch point can be calculated accurately.

[0003] However, at least following problems exist in the prior art: when the finger of the user wears a glove or other insulation medium to touch the touch substrate, no coupling capacitance will be generated between the finger and the sensing electrode and the driving electrode, thus touch function of the touch substrate cannot be triggered.

SUMMARY OF THE INVENTION

[0004] An object of the present invention is, in view of the problem that touch function of the touch substrate cannot be triggered when no coupling capacitance is generated between the finger and the sensing electrode and the driving electrode, to provide a touch substrate which can perform touch function even when no coupling capacitance is generated between the finger and the sensing electrode and the driving electrode.

[0005] In order to achieve above object, a technical solution adopted by the present invention is a touch substrate, comprising: a base substrate, and an electrode layer, a bridging portion and a sensor provided above the base substrate, the electrode layer comprises a plurality of first electrodes and a plurality of second electrodes, the first electrode and the second electrode are provided intersecting with each other, the sensor corresponds to intersection position of the first electrode and the second electrode, and is connected to the first electrode and the second electrode respectively, wherein the sensor is configured to generate a piezoelectric signal when a touch occurs, and the electrode layer is configured to transmit the piezoelectric signal for the touch substrate sensing position of touch point.

[0006] The touch substrate may further comprise a sensing chip connected to the electrode layer for the touch substrate sensing position of touch point.

[0007] The touch substrate may further comprise a protective layer provided between the electrode layer and the bridging portion.

[0008] The bridging portion may be configured to bridge the first electrode or the second electrode.

[0009] The sensor may be connected to the bridging portion.

[0010] The sensor may have a thickness ranging from 0.01 μm to 0.1 μm.

[0011] The sensor may have an area ranging from 10^2 μm^2 to 100^2 μm^2.

[0012] The sensor may be formed of one of ZnO, SnO_2, In_2O_3, IZO, ZTO, IGO, IGZO, ZITO, AZTO, GZTO, HIZO.

[0013] The sensor may have a sheet-like shape.

[0014] As another implementation, the present invention provides a manufacturing method of a touch substrate, and the touch substrate is any one of above touch substrates, the manufacturing method comprising steps of:

[0015] forming a base substrate; and

[0016] forming an electrode layer, a bridging portion and a sensor above the base substrate;

[0017] wherein the electrode layer comprises a plurality of first electrodes and a plurality of second electrodes, the first electrode and the second electrode are provided intersecting with each other, the sensor corresponds to intersection position of the first electrode and the second electrode, and is connected to the first electrode and the second electrode respectively.

[0018] The manufacturing method of the touch substrate may further comprise a step of: forming a protective layer between the electrode layer and the bridging portion.

[0019] The bridging portion may be configured to bridge the first electrode or the second electrode.

[0020] The sensor may be connected to the bridging portion.

[0021] As another implementation, the present invention provides a driving method of a touch substrate, and the touch substrate is any one of above touch substrates, the driving method comprising steps of:

[0022] generating a piezoelectric signal when the sensor is deformed by a touch; and

[0023] transmitting the piezoelectric signal by the electrode layer for the touch substrate sensing position of touch point.

[0024] As another implementation, the present invention provides a touch panel, comprising an array substrate, a color filter substrate and a touch substrate, the touch substrate is any one of above touch substrates.

[0025] As another implementation, the present invention provides a touch device, comprising above touch panel.

[0026] A sensor is provided in the touch substrate of the present invention and the touch substrate involved in the manufacturing method and the driving method thereof, the touch panel and the touch device of the present invention, when a touch occurs, a piezoelectric signal can be generated from the sensor and is transmitted by the electrode layer for the touch substrate sensing position of touch point, the position of the touch point is determined without need of coupling capacitance to be formed between the finger and the sensing electrode and the driving electrode, even if the finger of the user wears a glove or other insulation medium to touch the touch substrate, the position of the touch point still can be determined accurately.